Two-variable Linear System:

a\*x + b\*y = ec\*x + d\*y = f

**Black Box Test**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| a\*d – b\*c = 0 | T | T | T | F | F | F |
| a\*f – c\*e = 0 | T | T | F | F | T | F |
| d\*e - b\*f = 0 | T | F | T | F | F | T |
| Test Case 1 | Infinity Solutions |  |  |  |  |  |
| Test Case 2 |  | No solutions |  |  |  |  |
| Test Case 3 |  |  | No solutions |  |  |  |
| Test Case 4 |  |  |  | One Solution |  |  |
| Test Case 5 |  |  |  |  | One Solution |  |
| Test Case 6 |  |  |  |  |  | One Solution |

Normally, when solving two-variable linear system, if the determinant is NOT 0 then the system has one solution, and if the determinant is 0, the system can have either no or infinity solutions. According to the Cramer’s rule we can distinguish between no or infinity solution by the cases in the table above.